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October 18th.

Vice-President BRIDGES in the Chair.

A letter was read from the Historical Society of Pennsylvania, dated October 7th, 1853, acknowledging the receipt of Proceedings, and also presenting the volumes of their Memoirs announced this evening.

Also a letter from Philo R. Hoy, M. D., dated Racine, Wisconsin, October 7th, 1853, acknowledging the receipt of his notice of election as a Correspondent.

Major Le Conte presented a paper for publication, entitled "Observations on *Crotalus durissus* and *C. adamanteus*, of Authors," which was referred to Dr. Hallowell, Professor Haldeman and Dr. Leidy.

Mr. C. Girard presented a paper for publication, entitled "Descriptions of new species of Reptiles collected by the U. S. Exploring Expedition, under Captain Wilkes—part 2nd." Referred to Dr. Hallowell, Dr. Le Conte and Dr. Leidy.

A continuation of Dr. Hoy's "Notes on the Ornithology of Wisconsin," was presented by Mr. Cassin, and referred to the Committee on the previous portions of the paper.

Dr. Leidy called the attention of the Society to the fragment of a jaw of an extinct Saurian animal, discovered by Mr. M'Leod in the New Red Sandstone of Prince Edward's Island. The specimen indicates a new and remarkable genus, for which Dr. Leidy proposed the name *Bathygnathus borealis*.

The portion of the jaw is the anterior part of the right lower half, and measures five inches in depth. It contains eight teeth, of which the longest when perfect has been two inches. They are compressed conoidal and curved, with the borders finely serrulated.

Professor Haldeman proposed to change the pre-occupied name of his *Meloe parvus*, in the report of Captain Stansbury's Expedition, to *M. parvulus*.

October 25th.

Vice-President BRIDGES in the Chair.

The Committee on Major Le Conte's descriptions of new *Arvicolæ*, reported in favor of publication.

Description of three new species of American Arvicolæ, with remarks upon some other American Rodents.

By JOHN LE CONTE.

From amongst the smaller mammals of this country I select out the genus *Arvicola* as a proper subject for a few remarks. Notwithstanding the researches of those who have preceded me, I have, within the last year, detected three species which have not yet been described. The object of my observations is not so much to bring these before the world, as to settle the synonymy of those which are already found in the books. The confusion among them is very great, and apparently every day increasing. What may be the result of my endeavors to enlighten this darkness, it is not for me to say. I can only hope that my con-

clusions may not in any instance prove erroneous. I do not think that the short and defective descriptions of others have misled me; although such might well have been the case. The following descriptions are made as full as possible, for the time has past when short descriptions of half a dozen words can be of any use; the unusual number of objects claiming our attention at the present day in the three kingdoms of nature, require them to be so drawn up that they never can be too minute, nor their details too extended.

The most inconceivable confusion has been introduced into Natural History by the publication, a few years ago, of a Fauna of the United States. An author who was scarcely capable of forming a scientific idea, introduced himself into a place, which a more modest man would have hesitated to occupy, and by assuming discoveries to which he had no right, and imposing names of his own upon animals which had long been known under other names, has dishonestly attempted to rob the real discoverers of the credit to which they were entitled.

Thus, the rubbish of synonymy has been increased, and doubt and uncertainty introduced where all might have been plain and distinct. I beg leave to offer a few instances of this author's conduct in this place; others will be produced hereafter. Harlen, in his Fauna Americana, states that the *Arvicola amphibius* of Europe is common in this country. Now, there is no proof that he ever saw this animal living or dead. He gives a description which is translated verbatim from Demarest, and shows a woful ignorance of the French language by translating "plus clair" clearer, instead of paler. Again, he tells us that the *Mus sylvaticus* is a native of the United States; and here again he makes free with the Frenchman's words, and again mistranslates. This animal was never seen living on this side of the Atlantic.

In the following descriptions I have admitted nothing which could be considered common to all the species of any genus, such as the color of the teeth, the hairiness of the posterior inner angle of the mouth, the squamosity of the under side of the toes, or the color of the eyes; all those matters merely fill up space, and ought from the first to be known as unvarying generic, not specific characteristics. Comparisons with other species mixed with the genuine characters, "notæ collatitiæ," so much reprobated by Linnæus, have likewise been studiously avoided.

1. *ARVICOLA APELLA*. Auribus brevissimis, sub pilis occultis, intus et extus pilosis. Pedibus gracilibus, brevibus. Cauda brevi, supra obscure badia, subtus cinereo-plumbea.

Hab. In Pennsylvania in agris cultis. (Dr. Woodhouse.)

Hair dark lead color, above tipped with brown, redder on the sides; beneath with gray, inclining to brownish on the chin and throat. Head short, blunt; ears very short, rounded, slightly hairy both within and without, entirely concealed under the fur, antitragus short, semicircular. Legs very short; feet pale brownish, covered with short, shining hair; thumb tubercle, furnished with a short blunt nail. Tail very short, above brown, beneath grayish. Length, including the tail, in. 4.7; head 1; ears .2; foreleg .5; hind leg 1.1; tail .7.

2. *ARVICOLA EDAX*. Brevis et robustus, supra spadiceo et nigro permixtus. Auribus extra pilos exstantibus. Cauda mediocri, supra nigra, subtus cinerea.

Hab. In California.

Body short and thick. Hair plumbeous black, above and on the sides tipped with shining brown mixed with black, beneath tipped with grey. Head short, blunt, ears round, not entirely concealed under the fur, hairy within and without, antitragus large, semicircular. Feet covered with short, shining gray hair, thumb, tubercle, with a short, very blunt nail. Tail moderate, hairy, above, dusky beneath, grey, with a slight tinge of brownish.

Length as before, in. 5.5; head 1.4; ears .5; foreleg 1.3; hind leg 1.5; tail 1.5.

3. *ARVICOLA AUSTERUS*. Supra fusco et nigro permixtus, subtus obscure schistosus. Auribus extra pilos exstantibus, extus pilosis. Cauda gracili, dense pilosa.

Hab. In Wisconsin. (Prof. Baird.)

Hair above dark plumbeous tip with brown and black, beneath dark slate-colored mixed with brown, particularly on the breast, the upper and under sides of the body being nearly alike. Head large and blunt; ears rounded, longer than the fur, outwardly hairy, inwardly only so on the upper margin; antitragus large, semicircular; whiskers black and grey, shorter than the head. Feet covered with shining grey hair; thumb tubercle with a compressed, sharp, hooked nail. Tail slender, thinly covered with short hair, above mixed brown and black, beneath brownish grey.

Length in. 5.5; head 1.3; ears .8; fore leg 1.1; hind leg 1.5; tail 1.4.

4. *ARVICOLA RIPARIUS*. Brevis et robustus, antice quam postice latior. Supra fuscus, per dorsum subnigricans, subtus cinereus. Capite obtuso, auribus sub pilis occultis, antitrigo magno. Cauda pilis brevibus bene vestita, supra nigra, subtus pallidissime fusca.

Hab. In paludibus provinciarum borealium. (Phila., Mr. Ord.) *A. riparius* Ord., Journ. Acad. Nat. Sci., vol. iv. p. 305. *A. pennsylvanica* Richardson, Fauna boreali americana, vol. i. p. 120. Idem Audubon and Bachman Quadrupeds of N. America, vol. i. p. 341. Id. Wagner's Suppl., vol. iii. p. 588. Id. Schinz, vol. ii. p. 247. *A. hirsutus* Dekay, Zoology of New York, vol. i. p. 86.

Body short and robust, broader before than behind. Hair dark lead color, above tip with brown, darker along the back, beneath with grey. Head short, larger and blunter than in any other species; ears short, rounded, hairy both within and without, entirely concealed under the fur; antitragus large, semicircular, nearly closing the auditory aperture; legs and feet brown, the latter covered with short, shining hair; thumb tubercle, with a short compressed sharp nail. Tail well covered with hair, above dusky, beneath very pale brown.

Length 6 inches; head 1.4; breadth of head 1.8; ears .4; fore leg 1 in.; hind leg 1.8; tail 1.3.

Swims and dives well; is found peculiarly on the marshes of those rivers where the *Zizania aquatica* grows. As there is a considerable difference in the teeth of some of these animals, I have, whenever it was in my power, pointed out their peculiarities. With the exception of one species which will be mentioned hereafter, they differ much from those of Europe. Unfortunately I have not been able to obtain crania of many of those here described, otherwise certain distinctive marks might have been obtained, which would have rendered their determination much more easy.

System of Dentition.—In the upper jaw the first molar is composed of 5 triangles, 1 anterior, 2 exterior and 2 interior; the second of 4 triangles, 1 anterior, 2 exterior and 1 interior, with a small posterior, rounded lobe; the third of 5 triangles, 1 anterior, 2 exterior very small, 2 interior, and ends in a treffle, the exterior lobe of which is nearly obliterated, leaving a plane space from the end of the tooth to the posterior triangle.

From this arrangement it results, that the line of teeth in the upper jaw consists externally of 9 salient and 9 re-entering angles, the two last of each small, and internally of 10 salient and 8 re-entering angles, exclusive of the interior emargination of the treffle.

In the lower jaw the first molar commences with a treffle, then follow 6 triangles, 2 exterior, 3 interior and 1 posterior; the second of 5 triangles, 2 exterior, 2 interior and 1 posterior; the third of 3 triangles, 1 anterior, 1 intermediate and 1 posterior; and the line of teeth is formed externally of 11 salient angles, including the exterior lobe of the treffle, and 9 re-entering angles, including the concavity of the side of the treffle, and internally of 11 salient and 11 re-entering angles, including the lobe and the emargination of the treffle.

5. *ARVICOLA ONEIDA*. Supra niger, pilis sparsis fuscis intermixtis, pluribus super caput et ad genas, lateribus et abdomine saturate plumbeis, hujus pilorum extremitatibus fuscis, illorum pallidioribus et cinereis. Auribus subpilis occultis. Cauda supra nigra, subtus nigrante.

Hab. A Noveboraco ad Pennsylvaniam. *Arv. Oneida* Dekay, Zoology of New York, l. c. p. 88.

Hair short and close, not shining; on the back black, with scattering brown

hairs, more numerous on the head and cheeks; dark plumbeous on the sides and belly, the hairs of the first tipt with brown, of the other with grey and light brown. Head very moderately blunt; lips white; ears small, rounded, hairy both within and without, and concealed under the fur; antitragus large, semicircular. Feet dusky, covered with short hair; thumb with a compressed, rounded nail. Tail above black, beneath dusky, very slightly covered with hair.

Length 5.2; head 1.1; ears .125; fore leg .9; hind leg 1.4; tail 1.4.

Said by Bachman to be the *Arv. pinetorum*, to which it bears very little resemblance.

6. *ARVICOLA NASUTUS*. Capite satis magno, magis quam in cæteris producto. Auribus ovalibus extra pilos exstantibus. Cauda bene vestita, supra fusca, subtus cinerascens.

Hab. Cum priore. *A. nasuta* Bach., Journ. Acad. Nat. Sci., vol. viii. p. 296. *A. nasutus* Wiegman, Arch. for 1843, part 2 p. 53. *A. noveboracensis* Rich., l. c. p. 84. *A. palustris* Harlan, Fauna Americana, p. 136; Schinz. l. c. p. 251.

Hair dark plumbeous, above about equally tipt with dark and light brown, having somewhat of a hirsute appearance, of a uniform mixed color over all the upper parts, beneath dark cinereous tipt with grey. Head moderately large, more elongated than in others. Ears oval, projecting beyond the fur, hairy both within and without; antitragus moderate, semicircular. Feet covered with shining, pale brown hair; thumb tubercle, with a compressed, curved, blunt nail. Tail well covered with hair, above dark brown, beneath greyish.

Length 6.5; head 1.8; ears .35; fore leg .8; hind leg 1.4; tail 1.2.

I have not, myself, met with this species any where but in Pennsylvania, but I have heard of it in almost all the Northern States. It has been confounded by Richardson with the *A. noveboracensis* of Rafinesque, which it very much resembles, but is easily told by the longer and narrower head, and by a difference in the upper incisors. Dr. Harlan, in his *Fauna Americana*, wishing to deprive Mr. Ord of the merit of having first described the *A. riparius*, published this species under the name of *A. palustris*, and quoted *A. riparius* as a synonym. His own ignorance defeated him in this project, and made his ill-faith more apparent. Had he only been honest, he would have consulted Mr. Ord on the identity of the two animals, and then might have justly claimed this species as his own.

7. *ARVICOLA PENNSYLVANICUS*. Capite satis magno et obtuso, dentibus primoribus superioribus margine interiore leviter subsulcatis. Auribus brevibus subpilis occultis, antitrago magno, auris aperturam omnino occludente.

Hab. In provinciis borealibus. (Phila., Mr. Ord.) *Arv. pennsylvanicus* Ord. *A. riparius* Rich., l. c. p. 120. *A. xanthognathus* Dekay, l. c. p. 90. *Lemmus noveboracensis* Raf. *A. pennsylvanicus* Wagner, l. c. p. 589; Schinz., l. c. p. 247.

Hair long, soft and glossy, dark lead color, above tipt with brown intermixed with longer black hairs, beneath tipt with shining grey. Head moderately blunt and large, upper incisors very slightly sulcate on the inner edge; lips white; ears oval, projecting a little beyond the fur, hairy both within and without; antitragus large, semicircular, entirely closing the auditory passage; feet dark brown, covered with short shining hair; thumb tubercle with a short, compressed, blunt nail. Tail depressed, well covered with hair, black, beneath a little paler.

Length 7 in.; head 1.4; ears .25; fore leg .9; hind leg 1.7; tail 1.8.

The dentition is nearly the same as of the *A. riparius*. In the upper jaw the posterior interior angle is furnished with a small, sharp, posterior lobe, and the third molar of the lower jaw terminates in a roundish piece, which is so cut by the last re-entering angle on its inner side as to form another interior salient angle, whence the interior line of teeth in the lower jaw is composed of 12 salient and 11 re-entering angles.

This species, first described by Mr. Ord, is probably the one confounded by

Pennant with the *Arv. agrestis* of Europe. It is very easily distinguished from any other of the genus that I have seen in America, by the furrow on the inner margin of the superior incisors, and by the large antitragus of the ear, which completely closes up the auditory passage as with a valve, the last character showing that it is peculiarly fitted for an aquatic life. It is generally pointed out by American naturalists as the *A. xanthognathus* of Leach, a species which I have never had the good fortune to see, and which I scarcely believe has ever been found far from the Arctic regions. As for its habits, it delights in marshy places, and swims and dives with much dexterity. It leaves the lower grounds, however, and is often found in upland meadows. Formerly it was very common in the vicinity of New York. This was before the advance of population on that favored spot had destroyed everything connected with nature, except the vices of man.

There is generally quoted in connection with this species of *Arvicola*, a figure in Wilson's Ornithology, vol. vi., pl. 50, which has nothing characteristic about it, and may as well be said to represent anything else.

8. *ARVICOLA BOREALIS*. Capite magno et obtuso, auribus brevibus, sub pilis occultis. Tarso subtus dense piloso. Cauda sparse pilosa, supra nigrante, subtus fusco cinerea.

Hab. In provinciis borealibus. (R. Island, Mr. Powell.) *A. borealis* Rich., l. c. p. 127. Wiegman's Archiv., 1843, part 2, p. 53. Schinz., l. c., p. 251. Wagner, l. c. 593.

Hair very shining, dark plumbeous, above and on the sides tipped with bright brown and black, so as to have a somewhat variegated appearance, beneath with gray very slightly tinged with brown. Head large, short and blunt; ears round, entirely concealed under the fur, hairy both within and without; antitragus large, semicircular. Feet light cinereous brown, covered with short shining hair, the tarsi beneath densely hairy; thumb tubercle, with a short, straight blunt nail. Tail thinly covered with hair, above dusky, beneath brownish grey.

Length in. 6.2; head 1.3; ears .25; foreleg .9; hind leg 1.7; tail 2.

9. *ARVICOLA CALIFORNICUS*. Subvariegatus rufescenti-fusco et nigro. Corpore brevi et robusto, pilis speciem hirsutiei habentibus, revera tamen mollibus et levibus. Auribus submagnis, pene sub pilis occultis. Cauda supra fusca, subtus fusco-cinerea.

Hab. In California. *A. Californica* Peale, Zool. Expl. Ex. Quadrupeds, 46.

Body short and thick. Hair rather long, very shining, at the roots plumbeous black, above and on the sides tipped with reddish brown and black in such a manner as to give it a hirsute appearance, which in reality it does not possess, beneath with grey. Head blunt; ears rather large, almost concealed under the fur, hairy both within and without. Feet covered with short shining, greyish brown hair; thumb tubercle, with a compressed blunt nail. Tail above brown, beneath cinereous brown.

Length 5.7; head 1.3; ears .46; fore leg 1; hind leg 1.5; tail 1.5; fur .45.

The dentition differs from that of *A. riparius* as follows: In the upper jaw the second interior triangle of the first tooth is furnished with a small, sharp posterior lobe, and the interior triangle of the second has likewise a sharp posterior lobe. In the lower jaw the first tooth is formed of 8 triangles, 1 anterior, which may rather be called an oval, 1 posterior, 3 exterior and 3 interior. The line of teeth in the upper jaw differs in having internally 9 salient and 9 re-entering angles, and in the lower jaw in having externally 10 salient and 9 re-entering angles, and internally 12 salient and 11 re-entering angles.

10. *ARVICOLA OCCIDENTALIS*. Pilis mollissimis et tenuissimis, extremitatibus superioribus rufis sine ulla nigri admistione. Auribus sub pilis occultis. Cauda sub compressa, supra et subtus concolore rufa.

Hab. In territorio Oregonensi. *A. occidentalis* Peale, l. c., 45.

Hair dark plumbeous, very soft and fine, above tipped with bright rufous without any admixture of black, beneath with grey. Head blunt; ears round, entirely concealed under the fur, hairy only on the outside; antitragus rather shorter than usual. Feet covered with short shining, rufous hair; thumb tubercle, with a

compressed sharp nail. Tail slightly compressed, rufous, of the same color both above and below.

The dentition is the same in every respect as in *Arv. riparius*.

We are indebted for this pretty animal, as well as for the preceding species, to the researches of Mr. Titian Peale, who was one of the Naturalists of the United States Exploring Expedition, under the command of Capt. Wilkes.

11. *ARVICOLA PINETORUM*. Pilis plumbeo-nigris, supra extremitatibus fuscis, subtus argenteo-cinereis. Oculis minimis, vix evidentibus. Auribus sub pilis occultis. Pedibus brevibus. Cauda brevi, obtusa, pilosa.

Hab. In Carolina et Georgia in cultis. Vulg. Mole Rat or Ground Mouse. *Psammomys pinetorum* Leconte, Ann. Lyc. 2, 133, tab. 2. *Arv. pinetorum* Aud. and Bach. Quadr. N. A., Vol. ii. p. 216. Wagner, l. c. p. 591. Schinz., l. c. p. 249.

Body cylindrical. Hair short, shining, plumbeous black, above tipped with brown, beneath with silvery grey. Head large, short and blunt; eyes very small, scarcely visible; ears small, roundish, hairy within and without, entirely concealed under the fur; antitragus short, flat, semicircular. Legs short, brown, covered with short shining hair; thumb tubercle, with a compressed, curved nail; nails of the toes long and slender, naked (no hairs projecting over them as in every other species.) Tail very short, blunt and hairy.

Length 3·8; head 1·1; ears ·15; fore leg ·7; hind leg ·8; tail ·7.

The dentition of this species, and of the following, differs very much from that of any others which I have examined. The molars in the upper jaw are precisely like those of the common European species; while in the lower jaw they are widely different. Upper jaw: the first molar is composed of 5 triangles, 1 anterior, 2 exterior and 2 interior; the second of 4 triangles, 1 anterior, 2 exterior and 1 interior; the impressed spaces on the crowns of the teeth, in the posterior interior triangle of the first and second teeth, are rectangularly oblong; the third molar is formed of three triangles, 1 anterior, 1 exterior and 1 interior, and ends in a three-sided piece, which is rounded at its apex, and deeply cut into on the interior side by the last re-entering angle. The upper line of dentition consists externally, of 9 salient and 8 re-entering angles, and internally, of 8 salient and 7 re-entering angles. In the lower jaw the first tooth begins with a treffle, then follow 6 triangles, 2 exterior, 3 interior and 1 posterior; the second of 5 triangles, 2 exterior, 2 interior and 1 posterior; the third is narrowed anteriorly, and formed of 3 triangles, 1 anterior, 1 intermediate and 1 posterior.

The lower line of teeth consists, externally, of 7 salient and 6 re-entering angles, with two emarginations on the external face of the last tooth, internally, of 11 salient and 10 re-entering angles.

Previous to the year 1810, this little animal, although well known in the pine region of lower Georgia for its depredations in the cultivated fields of the inhabitants, had not made its appearance in the oak lands. The first one that I ever saw was at that time brought to me as a great curiosity; since then they have become extremely common, and very destructive to sweet potatoes and ground nuts. How long they have been known in South Carolina I have no means of ascertaining.

Its life is wholly subterranean; it is therefore never seen except when accidentally or designedly turned up from beneath the surface.

12. *ARVICOLA SCALOPSOIDES*. Capite magno et obtuso; auribus parvis margine solo exteriore piloso, sub pilis occultis, tarso subpiloso. Supra castaneus subtus cinereus.

Hab. In Pennsylvania. *A. scalopsoides* Bachm. Journ. Acad. Sci., Phil., vol. viii. p. 299.

Hair shining, plumbeous, above tipped with chesnut slightly mixed with blackish, beneath cinereous tipped with grey, the latter color tolerably distinctly separated on the sides from the former. Head large and blunt; ears rounded, hairy inwardly on the upper edge only, concealed under the fur; antitragus small, semicircular; whiskers grey, longer than the head; feet covered with short shining,

short, shining, pale brown hair; carpus and tarsus hairy beneath. Tail well clothed with short hair above and tipped with dark brown, beneath pale brown.

Length 4.7; tail .8; head 1.2; ears .17; fore leg .8; hind leg 1.4.

The dentition is precisely like that of the preceding, the *A. pinetorum*.

I know nothing of the habits of this animal, but conclude from its large eyes, that its life is not subterranean.

The next genus which I shall examine is *Hesperomys*; of this I have two new species to describe, one from the North and one from the South, and, as an appendage, shall add the *Mus Lecontei* of Bachman, which is a *Reithrodon*, and neither a *Mus* nor a *Hesperomys*.

Those American animals which were formerly arranged in the genus *Mus*, have, from a more attentive examination been removed to this. For a long time naturalists hesitated where to place them; hence, we sometimes find them called *Arvicolæ*. Mr. Waterhouse finally gave them the name which they now bear. Whether the illustrious author intended by this name to indicate their nocturnal habits, or their western habitat, in either case it is perfectly appropriate. It may well be doubted whether there is a single species of *Mus* really indigenous to America. There is but one instance which makes me hesitate to assert this positively. In Georgia there is a rat, inhabiting the middle parts of the State, which Dr. Bachman considers as a variety of *Mus Rattus*, from which, however, it appears to me to differ very considerably. How it could be imported from abroad and only found in the interior of the country, and there not in cities and among human habitations, I cannot conceive. Why has it not extended everywhere as well as in the more Southern States? and why has nothing resembling it ever been described in Europe, whence we have undoubtedly received the *Mus Rattus*? It may have been brought from Africa or some tropical region, and therefore not able to bear any colder climate than that of Georgia or South Carolina.

The molars of *Hesperomys* vary from those of *Mus* in the following particulars: They are proportionally longer and smaller. In *Mus* they have each three transverse striæ-tubercles; in *Hesperomys*, the series of teeth present a double row of tubercles not standing perfectly opposite each other, but more or less alternating, and separated in the middle by a deep longitudinal furrow meandering among them; the inner ones of these tubercles in the upper jaw and the outer ones in the lower, seeming to be formed by a reduplication in the sides of the teeth. All the molars have some alternating indentations or folds of the enamel. The first has 2 internally and 1 externally, the rest having one on each side, except *H. leucopus*, which in the second superior molar has 2 on each side, one of the exterior being smaller. On the two first teeth of the upper jaw there is a small false tubercle at the mouth of each of the indentations. The indentations and the tubercles of the hindmost tooth, both above and below, become early obliterated. In the lower jaw the number of tubercles are similar to what we find in the upper, that is to say the first tooth has 5 tubercles, the second 4 and the third 3. This is the structure of the dentition when the teeth are not altered by age and long use; when, however, the tubercles become ground down, the plicated figures, which formerly were of a determinate and invariable form, become changed, and finally vanish entirely, and the surface of the tooth becomes plain. When the teeth of a *Mus* are abraded, there are formed on the surface simple oblique furrows across their crowns. I begin with the largest of the genus.

1. *HESPEROMYS PALUSTRIS*.—Pilis cinereis, supra saturatoribus, extremis talibus supernis fuscis et nigris, abdominalibus cinereo-albis. Auribus parvis intus et extus pilosis.

Hab.—In Georgia et Carolina oryzaceis. *Mus palustris* Harlan, Silliman's Journ., xxxi. 385. Wagner, l. c. p. 543. *Arvicola oryzivora* Aud. and Bach., Quadrupeds of N. A., vol. iii. p. 214.

Hair cinereous, above darker, tipped with brown and mixed with longer and blacker hairs, which are more numerous on the back, so as to make that part of the body much darker, beneath tipped with grey. Nose rather pointed; ears small, nearly round, clothed both inwardly and outwardly with short hair. Feet

covered with short, silvery brown hair, not projecting over the nails. Tail scaly, thinly covered with short hair, more densely on the under side.

Length of the head and body in. 5·5; tail 4·8; head 1·6; ears ·45; fore leg 1·1; hind leg 2·; foot 1·35.

In the short synonymy attached to this species there is more to be found than at first sight meets the eye. It is with much regret that I find myself compelled to adopt Harlan's name, and to consider the very appropriate one proposed by Dr. Bachman as a synonym. The following explanation of the circumstances which force me to this will, I hope, be satisfactory. May it produce an effect quite contrary to what was calculated upon by the author of the name. Dr. Harlan was certainly the first describer of this animal. In natural science the law of priority is inflexible; and a fact made known by a vain and ignorant pretender, or procured, as in the present instance, by dishonorable means, is entitled to the same record as one discovered by the patient and sincere searcher after truth. Dr. Bachman's observations on this subject, in the third volume of the *Quadrupeds of North America*, seem to imply that, as the name of *Arvicola palustris* is pre-occupied by Harlan himself, in *Fauna Americana*, p. 136, the specific name could not be given to the animal before us; but as it is by no means an *Arvicola*, and as Harlan called it a *Mus*, (as in his day it would have been called by every one,) the objection is of no avail, and the name must stand. Besides, the *A. palustris* of Harlan is itself, with him, a synonym of *A. riparius*, but truly a synonym of *A. nasutus*; the man's ignorance defeating his dishonest intention to deprive Mr. Ord of the name.

This rat inhabits the inland rice plantations of Georgia and South Carolina; dives and swims with the most perfect ease. It makes its nest among the rice about two feet from the ground, but in the winter burrows in the dams; is very carnivorous, and so nearly resembles the *Mus decumanus*, or house rat, as at first sight to be taken for it. It is readily distinguished by the shortness and hairiness of the ears.

2. *HESP. GOSSYPINUS*. *Supra fuscente-badius, lateribus dilutioribus, subtus cinerascens-albidus. Capite magno, naso elongato, auribus magnis, erectis, rotundis, nigrantibus, extus subnudis.*

Hab. In Georgia. *Vulg.* Cotton Mouse.

Hair dark plumbeous, above on the top of the head and back tipped with brown and dusky, on the other parts with brownish tawny, lightest on the sides, beneath slightly with whitish and cinereous, so that the under side of the body appears greyish, which color is rather abruptly separated from the tawny of the sides, upon which it rises in a curve a little behind the fore legs. Head very large; nose long, projecting, dusky; cheeks tawny; lips white; eyes large and prominent; ears large, round, erect, dusky, almost naked, with a few short, brown, appressed hairs at the base. Nails covered by the hair of the toes. Tail hairy, above dusky, beneath brown.

Length of head and body 4·5; tail 3 inches; head 1·5; ear length ·67, breadth ·66; fore leg 1·1; hind leg 1·9; tarsus ·8.

Younger individuals are not so tawny on the sides as the older. This species is considered by Dr. Bachman as a variety of the next. It is, however, three times as large, and lives in a different manner. It forms its nest under logs and under the bark of decaying trees, generally of cotton, frequently using more than a pound of this material for the purpose.

Fifty years ago this mouse was scarcely known to the inhabitants of the southern parts of Georgia. Since then they have become extremely common, have left the fields and woods, and taken up their abode in barns and dwelling houses. In the year 1809 I first saw and, for my private satisfaction, made a description of this animal. The specimen was a female; and when caught, had two young ones attached to her tail, with which she was endeavoring to escape. I never saw but one other for several years after, I then found, probably in the year 1822, that no animal of this kind was more numerous over the whole of that part of the country.

It differs from the next, *H. leucopus*, more obviously, in the nose being more

prominent, the head larger, and the fore feet not being so different in length from the hind as to cause its usual mode of progression to be by leaps. The proportion between the fore and hind feet in this species being as 1 to 1.75, whereas in *H. leucopus* it is as 1 to 2.

3. *HESP. LEUCOPUS*. Supra læte badius interdum prope aurantiacus, subtus niveus, coloribus a se abrupte disjunctis. Capite subobtusum, auribus magnis, erectis, ovalibus, subnudis, margine angustissimo sub-albido.

Hab. In provinciis borealibus. *Hesp. leucopus* Wagner, Schreber, Suppl. vol. iii. p. 528. *Musculus leucopus* Rafinesque, Am. Month. Mag., vol. iii. p. 444. *Mus leucopus* Richardson, l. c. p. 142. Id. Dekay, Zoolog. New York, vol. i. p. 82. Id. Schinz., vol. ii. p. 176. *Mus agrarius*, var. 2, Turton's Linnæus, vol. i. p. Id. Godman's Fauna, vol. ii. p. 88. *Mus sylvaticus* Harlan, Fauna, p. 149. (Description translated from Demarest and not applicable.) *Arvicola Emmonsii* Emmons, Mass. Report. p. 61. *Cricetus myoides* Gapper, Zool. Jour., vol. v. p. 204. *Cricetomys myoides* Schinz., l. c. p. 204. Field Mouse, Pennant, Arc. Zool., vol. i. p. 131. Vulg. Jumping Mouse.

Hair dark plumbeous, above tipped with tawny or dark orange, on the top of the head and back with brown and tawny, beneath, for at least two-thirds of the length of the hair with snowy white; the tawny color of the sides very bright, and abruptly separated from the snowy color of the belly, the line of separation very distinct and well defined, and curved upward on the sides both before and behind the forelegs. Head moderately blunt; eyes prominent, black and very lively; nose and lips white; cheeks bright tawny; ears large, erect, oval, blunt, nearly naked, being furnished with short, closely appressed hairs, not in very great quantity, and narrowly margined with whitish. Fore legs generally white on all sides; hind legs outwardly tawny, inwardly white; feet pale flesh color, with closely appressed white hairs projecting beyond the nails. Tail above brownish dusky, beneath cinereous brown. In winter the fur frequently becomes darker colored, being over almost all the upper parts dark cinereous mixed with tawny.

Length in. 3.9; head 1.2; ears height .55, width .35; fore leg .9; hind leg 1.8; tail 2.9; tibia and tarsus 1.8.

Specimens are brought from California and from Oregon that are above much darker colored; the plumbeous color of the lower portion of the hair appearing more distinctly among the tawny tips, which are thus rendered but here and there visible; the upper color is separated from that of the belly as distinctly as in others; the outer side of the fore legs, however, is not white, but of the color of the back. In other specimens, the upper parts are more uniformly brownish tawny, and the belly not so white; the fore legs also are of a dull white. In none of them are the white parts so beautifully snowy. All of them that I have seen had been preserved in alcohol, and were, therefore, more or less unfit for description. There may be really distinct species among them.

This animal burrows in the ground, forming long galleries, and proves very destructive in gardens. It becomes, in some places, impossible to cultivate certain species of bulbous roots, as hyacinths, tulips, &c., without some contrivance by which they may be protected from their depredations. The best method which I have seen used was, surrounding each root with a flower pot, the bottom of which was knocked out. The robber does not penetrate very deep into the earth, he is thus quickly stopped in his progress, and forced to look elsewhere for food. Their usual mode of progression when on the surface is by leaping, hence their name of Jumping Mouse. The name of Deer Mouse is given in Canada to the two species of *Jaculus*; it is only used in that country, as the *Jaculi* are so seldom seen in the United States as to be only known to naturalists. In the winter they enter houses, particularly cellars, and support themselves in the same manner as the *Mus musculus*. In green houses they are extremely destructive to cacti and other succulent plants. I have never known them to form their nests in trees, or to occupy deserted birds' nests; it is another species of this genus which has this habit. This species I have found it impossible to obtain, although formerly quite numerous in the vicinity of New York. M. de Selys Longchamps, in his *Micro-mammalogia*, pp. 66 and 67, makes some observations

on this mouse, and proves that it cannot be the same as the *Mus sylvaticus* of Europe; he calls it *Mus noveboracensis*. I cannot find whence he got this name, but should rejoice much to find that it had been proposed by some naturalist before Rafinesque, that we might get rid of the Greek name which is now indissolubly attached to it.

4. *HESP. CAMPESTRIS*. Supra fuscus, subtus cinereo-fuscus. Capite magno, auribus magnis, ovalibus, obtusis, pilis brevibus sparse vestitis.

Hab. In Nova Cæsarea.

Hair plumbeous black, above tipped with brown, beneath with cinereous brown, darker about the mouth. Head large; ears large, oval, blunt, thinly covered both within and without, with very short, closely appressed hair. Legs and feet brown. Tail well clothed with tolerably long hair.

Length in. 3·4; head 1·2; ears 55; width ·4; fore leg ·45; hind leg 1·6; tail 2·7.

This species was found in the collection of the Academy, and labelled *Mus campestris*, from New Jersey. The specimens were preserved in alcohol, and therefore scarcely fit to be described; there was, however, enough to show that they were different from any hitherto described animal.

5. *HESP. SONORIENSIS*. Supra saturate cinereus fuscescens-canoleviter intermixtus, subtus albescens. Capite elongato, auribus magnis. Cauda modica.

Hab. In provincia Sonoræ.

Hair above dark cinereous or slate color, slightly mixed with brownish grey, more thickly on the head, nose, and behind the ears, and with grey on the sides; beneath whitish, except on the throat, which is mixed slate-color and whitish. Head elongated, pointed; ears large, oval, hairy both within and without, and with a distinct narrow grey margin. Feet covered with short, whitish brown hair. Tail moderate, above dark brown, beneath paler.

Length in. 3·3; head 1·2; ears ·4; fore leg 1·; hind leg 1·8; tail 1·9.

Resembles in some degree the *H. leucopus*. Collected by the Boundary Commission, under Major Graham.

These are all the species of this genus of which I have specimens at present. Messrs. Audubon and Bachman describe in addition, *H. humilis*, *H. aureolus*, *H. carolinensis* and *H. michiganensis* under the genus *Mus*. With all of these, except the last, I was well acquainted forty years ago.

I cannot omit saying something here of an animal described by Dr. Dekay in the Zoology of the State of New York, vol. i. p. 31, under the name of *Mus Americanus*. This is certainly a *Hesperomys*, or a species of one of the allied genera, and not a *Mus rattus*, as Dr. Bachman supposes. It is some years ago since it was found in the city of New York, and handed to me for examination by Mr. John G. Bell. I took the following notes of it at the time, and had it passed to Dr. Dekay, who was then engaged in writing the Zoology of the State.

The animal was above and beneath of a uniform dark plumbeous black inclining to dusky; head rather blunt; eyes prominent; ears oval, blunt, externally naked, internally sparsely hairy. Feet small, covered with short shining hair; toes white. Tail short; terete, annulose scaly.

Length of head and body 9·3; tail 5·6; head 2·4; ears ·75; width ·45.

REITHRODON LECONTEI. Supra rufo, fusco et nigrante mixtus, subtus albidus; naribus carunculatis, labris tumidis. Auribus magnis.

Hab. In Georgia. *Mus Lecontei* Bachman, Jour. Acad. Nat. Sc., vol. viii. p. 307.

Hair plumbeous, above tipped with rufous, dark brown and dusky, the latter color prevailing more on the back. Forehead much arched; eyes large; lips tumid; nostrils each furnished beneath with a small caruncle pointing downwards; ears oval, large, hairy both within and without. Feet very pale flesh color, covered with short cinereous brown hairs. Tail long, nearly naked, above brown, beneath paler.

Length in. 2·5; head ·8; ears ·2; fore leg ·5; hind leg ·8; tail 2 inches.

Very much resembles the common mouse. Burrows in the earth and comes out at night to eat. Its food appears to consist chiefly of green vegetables.

In the preliminary remarks to this memoir, I alluded to a species of *Mus* inhabiting the Southern States, which might be considered as native and not imported, which was mentioned in Audubon and Bachman's *Quadrupeds* as a variety of *Mus rattus*. This animal was known many years ago to Seba, Klein and Brisson, and figured or described by them. The following description of it made many years ago, although some what imperfect, may help to point it out.

MUS AMERICANUS. Hair dark cinereous, above tipped with reddish brown, and dusky with many long scattering hairs of the latter color, beneath with white, having a tinge of yellow particularly towards the sides. Ears rather large, oval, blunt, naked. Feet whitish, covered with short hairs. Thumb tubercle furnished with a short blunt nail. Tail terete, long, annulosely scaly, furnished with short hair.

Hab. In Georgia and Carolina. *Mus Americanus* Turton's *Linnæus*, Vol. I. p. 50. *Rattus Americanus* Brisson, *Regne Animale*, p. 172. *Mus Americanus* Klein, *Quad.* p. 53. Seba, Vol. II. tab. 29, fig. 2.

This rat was formerly very common in the midland counties of Georgia. I, however, know nothing of its habits. The following measurements were taken from many different specimens. Length of head and body 7.74; tail 7.8; head 2.05; ears .9.

MUS VIRGINIANUS. Color entirely white. Ears, feet and tail flesh color. Eyes brown. Ears moderate, blunt, naked. Feet thinly covered with short hair; thumb-tubercle with a short blunt nail. Tail thick, rather blunt, quadrangular, the upper side convex, the others plane, annulosely scaley, with short hairs proceeding from the base of the rings.

Hab. In Texas.

Length h. and b. 7.3; tail 6.2; diameter at root .3, at point .2.

Mus Virginianus Turton, l. c., p. 82. *Mus albus virginianus* Brisson, l. c., p. 173. *M. agrestis virginianus* Klein, l. c., p. 57. Seba, Vol. I., tab. 49, fig. 4. *Virginian rat* Pennant. *Art. Zool.*, Vol. I., p. 32.

In the year 1840, a ship arrived at New York, from Tampico, which was overrun with rats of this species; a number of them were given to Mr. J. J. Audubon, who made a drawing of the animal and kindly gave me one, from which the above description was made; it is not as full and perfect as it might be, as I had no thought at the time of ever publishing it. The cranium differed in many respects from that of the *M. decumanus*, to which it appeared evidently allied, although the tail was so different. I shall close these observations with a few remarks on some other Rodentia.

NEOTOMA FLORIDANUM. Is by no means confined to the southern states, three individuals having been taken by Mr. Bell, of New York, near Nyack, on the western bank of the Hudson river, about twenty miles above the city. One of these was considerably larger than any I had ever seen, the head and body measured 11 inches, the tail 7.5.

This animal was first described by Mr. Ord, in the *Bulletin of the Société Philomathique de Paris*, in the year 1818, under the name of *Mus floridanus*, and afterwards in the *Journal of the Academy of Natural Sciences*, of this city, as *Neotoma floridana*. Harlan arranged it under the genus *Arvicola*, from which it differs very much in its dentition, as well as in other respects. It is the American rat of Pennant, *Arct. Zool.*, vol. i., p. 130, where he confounds it with a Siberian animal described by Pallas.

SIGMODON HISPIDUS. This animal is subject to considerable variation in the middle molar of both jaws, which has usually but one external and one internal enamel fold on each side, sometimes, however, there are two external folds, the additional one being anterior and smaller.

We are indebted to Mr. Ord for the first published notice of this rat, which

appeared in the Journ. A. N. S., vol. iv. p. 352. It is described by Harlan in his Fauna as *Arvicola hortensis*, and afterwards in Silliman's Journal, vol. x. p. 285, under a different name, *Arvicola ferrugineus*. When Mr. Ord first brought this animal from Florida, he deposited his specimen in the Philadelphia Museum, in care of Mr. Peale, with a particular injunction against its getting into the hands of any one else. Dr. Harlan, who had free admission to this institution at all times, went there when he knew no one would be present, took the specimen away, and afterwards described it under the very inappropriate name of *Arvicola hortensis*. The consequence of this, to say the least of it, unfair conduct, was a positive banishment from the Museum for the future. Somewhat of a similar manoeuvre caused him, sometime after, to be banished by the police from the city of Paris.

In the plates to the voyage of the French ship *Venus* there is figured a rat, which is called *Neotoma Floridana*, which probably belongs to this genus, and may be considered as a new species. The teeth have no resemblance to those of a *Neotoma*, which, like those of *Arvicola*, are formed of triangles. Not being able to refer to the text of this work, it is impossible to say of what country it is a native. It may have been found on the western coast of our continent, in California or Oregon.

The name by which the *Sigmodon* is known in Georgia is the Small Wood Rat, the *Neotoma* being called simply Wood Rat. They both keep at a distance from houses, concealed in the woods or hedge rows.

I conclude this rambling part of my paper by stating that, of the two *Jaculi* found in this country, the *Labradore Rat* of Pennant, *Arct. Zool.*, vol. i. p. 132, since called *Dipus*, and *Meriones*, but now *Jaculus*, has very large ears, and is the same as the *Gerbillus leonurus* of Rafinesque. The *Jaculus Canadensis* has very small ears, and may thus be easily distinguished; they are both called Deer Mouse by the inhabitants of Canada.

The Committee on Major Le Conte's paper on *Crotalus durissus* and *C. adamanteus*, reported in favor of publication.

Observations on the so-called Crotalus durissus and C. adamanteus of modern authors.

By JOHN LE CONTE.

Cuvier, in his "Règne Animal," in a note on the genus *Crotalus*, observes, that the Linnean specific names of *horridus* and *durissus* have been in different ways changed between these two species. He was perfectly correct in this; and any one consulting the authors who have written on reptiles, will, in my opinion, be at no loss to determine what the illustrious Swede meant by these two specific names. In the Southern States we have but two species of *Crotalus*, as the genus is now restricted. They are familiarly known as the Pine Barren and the Oak Ridge rattlesnakes. Until it is possible to determine how either of these was named by Linnæus, and I cannot doubt that he had seen them both, I hope I may be pardoned if I use these popular names to distinguish them from each other. The first has, by English authors of the last century and by Cuvier, been considered the *horridus*, and the other by Shaw and Pennant, as the *durissus*; in the last case manifestly improperly, as will appear hereafter. In order, however, to elucidate this matter, I will commence with the descriptions given by Linnæus in the twelfth edition of his *Systema Naturæ*, the publication of which he superintended himself in the year 1766, and by Gmelin in his edition of the year 1798.

CROTALUS HORRIDUS. Scutis 167, scutellis 23.

Mus. Ad. Frid., p. 39. Brad. Natur., tab. ix. fig. 1. Seba, Mus., vol. ii. tab. xcv. fig. 1.

This we may say is no description at all. But referring to the Museum regis Adolphi Friderici, we find the following :

Crotalus horridus.—Caput ad latera postice gibbum. Frons tecta squammis obtusissimis, quarum elevatus margo. Palpebræ superiores planæ, magnæ. He refers to Catesby for an account of its habits, who has described and figured a serpent with transverse bands on the back ; and also to a figure in Seba's Museum, vol. ii. tab. xcv., which represents one with rhombic spots. This shows how incorrectly references to figures can be made : " Quando que bonus dormitat Homerus."

Gmelin, in his edition, adds to Linnæus—Bodaert, Nov. Act. Acad. Cæsar., vol. vii. p. 16—*Crotalus maculis trigonis fuscis*. *Caudisona terrifica* Laurenti, p. 93. Michael. Gott. Mag. iv. 1, p. 90.

This only tends to make the confusion greater. The animal which Bodaert described could not be one with diamond shaped spots on the back ; there is no difficulty in distinguishing a triangle from a quadrilateral figure, it therefore could not have been a species with rhombic spots. In all the individuals of the species with transverse fasciæ, which I have ever examined, these bands were more or less broken up, especially in front, in which the marks formed more or less perfect chevrons, and might easily be called triangles.

The *Caudisona terrifica* of Laurenti is our North American species with rhomboidal spots, and is thus described by the illustrious Italian : " Corpore carinis squammarum exasperato (mari) cinereo-flavo (feminæ) spadiceo, maculis dorsi rhomboidalibus, magnis, ex nigro fuscis, albo limbo cinctis, apicibus subconjugis, per summum dorsi caudamque concatenatis. *Hab.* In America infra gradum, elev. 45.

The other species *durissus* is thus described by Linnæus :

CROTALUS DURISSUS. Scuta 172, Scutellis 23.

Amœnitat. Acad., i. p. 500. Seba Mus., ii. tab. xcv. fig. 2. Gronov. Mus., ii. p. 70.

Albo flavoque varius, maculis rhombeis nigris disco albis. Gmelin adds to these references, Bodaert, l. c. No. 2, *Crotalus albus maculis rhombeis*. Laurenti, p. 93, *Caudisona durissus*. Weigel, Act. Soc. Hal., i. p. 7. Catesby, Carolina, ii. tab. xli., who figures a species with transverse bands, and not with rhomboidal marks. Vosmaer Monog. *Crotalus fasciis collique duabus nigris*. Now, from all this we may collect that there are three species described, very distinct from each other, but strongly mixed together ; one with rhombic spots, the discs of which are white ; one with rhombic spots, the limb or margins of which are white ; and one with triangular spots. I proceed now to show what the three species are, and shall commence with the first, of which we have a fair specimen in our collection, which is named *C. horridus*, because it agrees with Seba's figure as misquoted in the description of that species, but which agrees so well with the description of another, that one would think it never could have been mistaken.

CROTALUS DURISSUS, Linn.

Fusco et flavo varius maculis per dorsum magnis rhombeis nigris, disco flavescens, non-concatenatis. Capite parte priore fascia-inter oculos transversa, summo et cervice lineis duabus longitudinalibus alteraque laterali nigris, spatiis intermediis flavescens. Scuta abdominalia 167, subcaudalia 21, primo bifido, scutellorumque ad basin crepitaculi paria tria.

Hab. In America meridionali. *Crotalus durissus* Lin. Laurenti, p. 93. Id. Cuvier Regne animal ii., p. 67. Id. Lacépède, ii. p. 423. Shaw, vol. iii. p. 333. *C. horridus* Daudin, vol. v. p. 311. Id. Latreille, vol. iii. p. 186.

A very good figure of this species is found in Vosmaer, which has been copied by Shaw.

Varied with dark brown and yellowish, with a row of large black rhombic spots, the discs of which are yellowish, down the back, and which are not joined together or concatenated ; these rhombs towards the tail gradually become less distinct, until at last they vanish, so that the hinder part of the body may be said to be only varied with black and yellowish. The tail is perfectly black on

all sides; the body beneath is yellowish, varied and blotched with dusky more distinctly and closely on the hinder part and on the sides. Head very large, with a black stripe from the eye to the corner of the mouth, and a transverse bar of the same color across the head just in front of the eyes, and joining the former stripe at the eye. Top of the head and neck with two longitudinal, black stripes, and another likewise on the side of the neck, the intervening spaces being yellowish. Rostral plate triangular, the apex sharp, pale brown or yellowish; there are two roundish yellow plates on each side of this, and two likewise between them on the top of the head, which are brownish and triangular, the apices pointing forward; behind them there is a narrow transverse bar of yellowish, and another of black, which is succeeded by a third one of yellow formed of four roundish scales, those near the eyes very large, the other rather smaller; the head is otherwise covered with tolerably large scales.

Length 4 feet 4 inches, with three rattles. Circumference of the body 8 inches.

In the description of *Crotalus durissus*, both Linnæus and Laurenti agree that the rhombs on the back have their discs white; and the former, in the *Amœnitates Academicæ*, says, that the area between the eyes is blackish, and has a broad transverse white line. We ought not to hesitate one moment in declaring that this species is not the *horridus*. The ground color of all the specimens which have been examined in Europe appears to have faded, therefore, the parts of the descriptions relating to this are of little value. It may be observed of reptiles in general, that parts of the body which when living were black, frequently change to grey or even white, when kept for any length of time in alcohol. The specimen from which the preceding description was taken, in parts which were originally black or dark brown, had become cinereous by the peeling off of the epidermis, and if this process had been carried on for the whole length of the body, scarcely any of the distinguishing characteristics would have been apparent.

Having thus determined what the *Crotalus durissus* of Linnæus is, I proceed to describe the two species which we have in the Atlantic States, calling them by their vulgar names, and leaving it to each naturalist to determine by what names they ought to be distinguished.

THE PINE BARREN RATTLE SNAKE.

Pallide rufescente fuscus ad nigrum tendens. Dorso fasciis transversis, irregularibus, serratis, nigris. Cauda nigra. Corpore subtile albescentis maculis minimis nigrascentibus.

Hab. Per totum Americam borealem, provinciis atlanticis. *Crot. horridus* Cuvier, *Regne Animale*. Id. Shaw, vol. iii. p. 317. Id. Pennant, *Arct. Zool. Suppl.*, p. 87. Id. Bodaert, *Nov. Act. Acad. Cæs.*, vol. vii. p. 16. *C. atricaudatus* Daudin, vol. v. p. 316. Id. Latreille, vol. iii. p. 209. *C. durissus* Daudin, l. c. p. 304. Id. Latreille, vol. iv. p. 322. Id. Holbrook, *Herp.* iii. p. 9. Id. Dekay, *Zool. N. Y.* vol. ii. p. 55 and 56. *C. boiquira* and *horridus*, Palisot de Beauvois, *Trans. Am. Phil. Society*, vol. iv. p. 368. Catesby, ii. tab. 41. A very excellent figure, shewing the animal in its highest state of perfection. Above pale reddish brown, somewhat duskyish, frequently with a yellowish or reddish vertebral line. Body with numerous transverse, irregular, serrate fasciæ of dusky or black, more or less interruptedly bordered with whitish. These fasciæ gradually diminish in distinctness towards the tail; as the color becomes darker or more dusky the bands become entire. Tail black on all sides, barred with paler. Body beneath whitish, thinly speckled with dusky. Head with a broad, dark brown line extending from the eye along the cheek to the corner of the mouth; often, however, it is almost entirely black; eyes red; neck very slender, most frequently with two short longitudinal black lines on the top. Rostral plate triangular; supernasals, one on each side, externally rounded; orbital and antocular plates large. Scales of the head small, resembling coarse shagreen. Body beneath whitish, thinly speckled with dusky. Abdominal scuta 170 to 178; subcaudal 18 to 25, with two pair of scales at the base of the rattle. The male is generally to be distinguished by a black spot behind the occiput.

The transverse bars are frequently broken up, particularly in front, and the larger portions form perfect chevrons.

The young are yellowish, with irregular dusky marks on the back and sides, the larger ones being transverse; none of them, however, are serrate, as in the older animals; instead of a rattle there is a small button at the end of the tail.

Grows to the length of 8 feet; one of this size had 9 rattles, whilst another of 5 feet had 14. Specimens of the rattles of these snakes have been shown consisting of thirty joints; these are fictitious, and made by taking the separate "grelots" from different rattles and joining them together, for they may be fitted in such a manner that the deception cannot be perceived. Had I not seen this artificial junction made in my presence, I should have considered these long "crepitacula" as really natural.

THE OAK RIDGE RATTLE SNAKE.

Supra niger vel fuscus, serie dorsali regulari rhomboidum magnorum, concatenatorum, limbo albo, disco fusco, variegato; subtus flavescens, nigro variegatus et maculatus.

Hab. In provinciis australioribus Caudisona terrifica Laurenti, p. 93. *Crotalus rhombifer* Daudin, vol. v. p. 325. *Id.* Latreille, vol. iii. p. 197. *C. adamanteus*, Palisot de Beauvois, Trans. Am. Phil. Soc., vol. iv. p. 368. *Id.* Holbrook, vol. iii. p. 17. *C. durissus* Pennant, Arct. Zool. Suppl., p. 90. *Id.* Shaw, vol. iii. p. 333, who confounds it with the *C. durissus*; of both species furnishing very good figures. Lacépède, vol. ii. p. 396.

Above black or brown, with a row of large black or dusky rhomboidal spots on the back, which on the limb or margin are whitish or yellowish, and on the disc mixed with brown; these rhomboids are connected together, so that the animal appears to have two yellowish lines running down the back and mutually crossing each other from right to left at certain intervals; they gradually become less distinct towards the tail until they vanish, some of the posterior ones changing into transverse bands. The sides of those which are brown are marked with two rows of dusky spots; those which are black, of course, must want these spots. Tail with alternate bars of black and yellowish, or black and dusky. Body beneath yellowish, mixed and spotted with dusky. Head very large, spotted with paler, with two yellowish and three black or dusky stripes on each side, sometimes entirely black, the top covered with small scales resembling coarse shagreen. Rostral plate pentangular, wider and rounded at the base; supranasal plates two, small, a larger quadrangular space between the rostral and nasal; behind the rostral is a large plate on each side, immediately behind these are two others; the palpebræ are large, transversely striate; antocular plate large. Abdominal scuta 170 to 178; subcaudal 23 to 32, and 4 pair of scales at the base of the rattle.

Length 6 feet with 6 rattles.

I come now to the conclusions which are to be drawn from the preceding remarks: and first, the so-called *horridus*, the Boiquira and Cascarella of many authors, is the *durissus* of Linnæus. I place little reliance on references to engraved figures, as in many instances they are made in a very careless manner. Thus, we find Linnæus quoting a figure in Seba's Museum, which does not tally with descriptions of other authors quoted by himself; and Laurenti, an author in other respects very cautious and accurate, refers to a figure in Catesby, of a serpent with transverse bars, as representing one with rhombic spots. We are driven, it appears to me, into this dilemma: either the name of *horridus* must be stricken out from acknowledged species, or given to that one which is called by so many *durissus*, or, we must call this last one *horridus*, and thus have the species with two distinct names. For, as I have observed elsewhere, there can be no doubt of the animal, so well described by both Linnæus and Laurenti, being *durissus*. Secondly, as for the other species, which Palisot de Beauvois called *adamanteus*, and which others have named *rhombifer*, &c., whether it was known to Linnæus cannot now be proven, although, for my own part, I have no doubt but that he confounded it with the South American species, or it may be the *dryinas* which had lost its color. See *Amœnitatis Academicæ*, vol. i. p. 501, where he says

that many names and synonyms which have been given to *C. dryinas* will also be common to *C. durissus*. The name of *adamanteus* must be changed to that of *terrificus*, as this last has the priority in date by thirty years. Others may think otherwise but

Rumpat et serpens iter institutum,
Si per obliquum similis sagitta
Terruit mannos.

A few words concerning the habits of these serpents. Their vaunted generosity in giving warning to those who approach them, is a ridiculous fable; in most cases they inflict their deadly wounds without sounding an alarm, and show themselves extremely vicious by making unprovoked attacks upon every thing that comes within their reach. With regard to their venom and the many antidotes which at different times have been pronounced infallible, I can safely declare that, in no instance where the fang has entered the body so as to penetrate one of the larger veins, has a recovery been known. Inevitable death is the consequence. They tell us that they cannot hurt deer or swine; the reason is obvious; the first has long legs with scarcely any muscular substance on them, and therefore no veins of any size; and in the case of the other, no snake's fang is long enough to pass through the skin and fat so as to meet a part obnoxious to the poison. I should have observed before, that a complete solution of the blood in the whole body is the immediate cause of death from the bite of a *Crotalus*.

Palisot de Beauvois, in the Transactions of the American Philosophical Society, has said, that these snakes have no fetid odor emanating from them; that in the presence of any number of them, no disagreeable smell is perceptible. On the contrary, I know from repeated experience, that their vicinity may generally be discovered by the fetor which they exhale, and that it is so strong when proceeding from one that is enraged, as to occasion a considerable degree of sickness of some hours duration. Most snakes emit a smell by no means pleasant; this has always been known, and is stronger and more deleterious in those which are venomous than in those which are not. Martial, in one of his epigrams, says:

Quod vulpes fuga, viperæ cubile
Mallem quam quod oles olere Bassa.

There is another fact connected with these snakes as well as many others, which has been the subject of much discussion. I allude to what has been called the power of charming smaller animals upon which they prey. This has been attributed to some secret fascinating power in the serpent. It has also been attributed to the fright experienced at the sight of so formidable an enemy. If it be said that the bird or the squirrel, in this predicament, fixedly gazed upon by the terrible eyes of the serpent, could easily make its escape, the answer is, that the unaccountable behaviour of the poor victim arises from its anxiety for its young. The only instances in which I have seen snakes endeavoring to get possession of birds, was at a time of the year when they had no young to take care of. Squirrels generally have their nests on such lofty trees in our forests, that it is very doubtful whether a snake's range of vision could reach so far, therefore, it must be something more than fear which can bring a squirrel down from his secure habitation, one hundred or one hundred and fifty feet from the ground, to become the easy and unresisting prey of a serpent. If he should be surprised on the ground, what prevents him from ascending the next tree and soon losing himself among the foliage of those which are in the neighborhood. I do not attempt to explain the thing, but call the attention of the reader of these observations to the behaviour of cats to birds, and of cats and dogs to men when they wish to obtain any thing from them. If there is any fascination in the steadfast gaze of the eyes, they attempt to employ it upon us.

It may not be out of the way at the end of these lines, to correct an error which is now current among naturalists, which is, that the fangs in the genus *Elaps* are always and permanently perpendicular, and not laid back as in other venomous serpents. This is not the case. Upon examining fresh killed specimens, I find them placed exactly as they are in a rattlesnake, and erected in the same way when they wish to bite, that is by throwing back a part of the upper

jaw; for notwithstanding all that has been said of their harmless nature, they will strike as any other venomous snake will, as I experienced last spring with one of the largest I have ever seen. Moreover, in some foreign specimens of this genus, if the fangs were always perpendicular in the jaw, the mouth would not be closed without their piercing entirely through the lower lip.

The Committee on Mr. Girard's descriptions of new Reptiles, reported in favor of publication.

Descriptions of new species of Reptiles, collected by the U. S. Exploring Expedition, under the command of Capt. Charles Wilkes, U. S. N.

SECOND PART.—Including the species of Batrachians, exotic to North America.

By CHARLES GIRARD.

Taking for our guidance the structure of the vomerine or palatine teeth, that of the tympanum and tongue, we have been led to subdivide the genus *Cystignathus* as understood by Duméril and Bibron, in the "Erpétologie générale." The structure of the fingers and toes have afforded accessory characters which are not to be neglected, although comparatively less important.

LEPTODACTYLUS, Fitz.—Vomerine teeth disposed in two transverse series, each constituting either an angular arch or a regular curve, and situated behind the inner nostrils. Tongue slightly notched posteriorly. Tympanum very distinct. Toes either provided with a rudimentary membrane or entirely free.

Obs.—LEPTODACTYLUS OCELLATUS, Fitz. (*C. ocellatus*, Dum. and B.), *L. LABYRINTHICUS* (*Rana labyrinthica*, Spix; *C. labyrinthicus*, Dum. and B.), and *L. TYPHONIUS*, Fitz. (*C. typhoni*, Dum. and B.), belong to this genus.

CYSTIGNATHUS, Wagl.—Vomerine teeth disposed upon a transverse or oblique row, more or less interrupted in the middle, and situated either between the inner nostrils or behind them. Tongue circular, subcircular or subcordiform, posteriorly entire, and either attached by its whole surface, or very slightly free behind. Tympanum distinct. Toes either bordered by a membranous fold or slightly webbed at their base.

Obs.—CYSTIGNATHUS MACROGLOSSUS, *C. GRACILIS* and *C. ROSEUS* of Duméril and Bibron will remain in this genus.

PLEURODEMA, Tsch.—Vomerine teeth disposed in two oblong groups situated between the inner nostrils. Tongue subcircular, either slightly emarginated or entire posteriorly. Tympanum indistinct. Toes either entirely free, or else provided with a rudimentary membrane at their base or along their margin. Skin pustulous or granular; sometimes a large lumbar gland on each side.

Obs.—PLEURODEMA ARUNCO (*Bufo arunco*, Schn.); *P. BIBRONI*, Tsch. (*C. bibroni*, Dum. and B.); *P. BUFONIUM*, Bell; *P. DARWINI*, Bell; *P. ELEGANS*, Bell, and *P. NODOSA* (*C. nodosus*, Dum. and B.), constitute another generic group.

CRINIA, Tsch.—Vomerine teeth either absent or else existing in a rudimentary state. Tongue elongated, subelliptical, posteriorly entire, or very slightly emarginate. Tympanum indistinct or hidden under the skin. Eustachian tubes very small. Fingers and toes subcylindrical, tapering to a point and perfectly free.

Obs.—This genus as characterized above, may not meet with the approbation of Erpetologists, as combining species deprived of vomerine teeth and others possessing but very few of them. Indeed, if we had more than one species differing from the others in similar characters, we should not hesitate to make two genera in the following manner:

CRINIA, Tsch.—Vomerine teeth few, constituting two groups at the posterior margin of the inner nostrils. Tongue entire, oblong. Tympanum not very distinct. Eustachian tubes quite small. Fingers and toes without membrane.—*CRINIA GEORGIANA*, Tsch.

RANIDELLA, Girard.—Palate without teeth. Tongue elongated, subelliptica, posteriorly slightly emarginated and free upon one-third of its length. Tympanum not visible. Eustachian tubes minute. Fingers and toes subcylindrical, tapering into a point and perfectly free.—**RANIDELLA SIGNIFERA**, Girard.

With no specimen of *Crinia georgiana* at our command, we have been unable to compare critically the characters of Crinias as just subdivided. For this reason we do not raise *Ranidella* to the rank of a genus for the present. If future investigations do not bring to light other species of each of these subdivisions, we shall not hesitate to consider *Crinia georgiana* and *Ranidella signifera* as congeneric species, in which the character of the vomerine teeth loses that importance which it has elsewhere.

Ranidella, as circumscribed above, is related to *Oxyglossus* and *Leviparus* in the absence of teeth on the palate, differing from both, however, in having its tympanum entirely hidden and its toes perfectly free.

Crinia georgiana is an analogue, in Australia, of the South American *Pleurodemas*.

WAGLERIA, Girard.—Vomerine teeth disposed on a single and very long transverse row, situated behind the inner nostrils. Tympanum small and not very distinct. Toes bordered by a membranous fold in the male. Tongue but slightly notched posteriorly.

Obs.—**WAGLERIA PERONII** (*C. peronii*, D. and B.), and **W. DORSALIS** (*C. dorsalis*, Gray, should the latter prove specifically distinct from the first), are the two species which constitute this genus. Both species are natives of New Holland, and of the first, specimens were collected by the Exploring Expedition in the south-eastern part of Australia. The latter we only know through the brief description of J. E. Gray.

KASSINA, Girard.—Vomerine teeth disposed in two V-shaped groups, situated behind the inner nostrils. Tympanum not distinct. Tongue cordiform, emarginated behind. Fingers free, the first shorter than the second. Toes entirely deprived of membrane. Skin perfectly smooth.

Obs.—**KASSINA SENEGALENSIS** (*Cystign. senegalensis*, Dum. and B.) is the only species hitherto known of this genus, the diagnosis of which may hereafter require some slight modifications, upon the reception of other species presenting the same disposition of the vomerine teeth.

Thus, the genera *Leptodactylus*, *Cystignathus* and *Pleurodema* are American; the genera *Wagleria*, *Crinia* and *Ranidella* are Australian, and the genus *Kassina* is African.

From want of specimens, and accuracy in their descriptions, we have not been able to determine, generically, *Cystignathus aeneus*, Guich., *C. schomburghii*, Trosch., and *C. sylvestris*, Tsch., all three from South America. The latter, apparently, belongs to the genus *Cystignathus* proper, but seems to be provided with a much smaller number of teeth, and likewise situated more anteriorly than is usually the case in that group. The visibility of the tympanum and the presence of a partial membrane to the toes are strongly suggestive of that genus.

RANIDÆ.

1. **LEPTODACTYLUS SERIALIS**, G.—Greenish brown on the head and back; yellowish brown on the sides and legs, with series of black maculæ. A post-orbital vitta tapering into a point towards the shoulder. Margin of the jaws maculated with black and white. Vomerine teeth disposed upon angular arches. Tongue cordiform, posteriorly free upon one third of its length, slightly emarginated at both extremities. Toes with a rudimentary membrane at their base and along their margin. Skin with indistinct longitudinal dorsal folds, otherwise smooth.

Obs.—Allied to *L. typhonioides*, but distinguished from the latter by the structure of the toes.

Locality.—Rio de Janeiro, 1839.

2. *LEPTODACTYLUS CALIGINOSUS*, G.—Reddish brown, with indistinct blackish maculæ on the back, more conspicuous on the hind legs; a large subcordiform occipital macula. A post-ocular vitta extending a little behind the tympanum. Vomerine teeth in regular curves. Tongue subelliptical, elongated, slightly notched at both extremities. Toes provided with a rudimentary membrane at their base and margined by a membranous fold. Skin smooth in the adult, traces of longitudinal folds in the young.

Obs.—Differs from the preceding species chiefly in the disposition of the vomerine teeth.

Locality.—Rio de Janeiro, Brazil.

3. *CYSTIGNATHUS PARVULUS*, G.—Yellowish brown above, with a deep chestnut narrow band extending from the tip of the snout to beyond the middle of the length of the body. Beneath unicolor. Head subtriangular, wedge-shaped. Anterior part of the snout depressed and regularly inclined towards the margin of the upper jaw. Legs quite slender.

Locality.—Rio de Janeiro, Brazil.

4. *CYSTIGNATHUS NEBULOSUS*, G.—Above, light brown, white and clouded with reddish brown; a large subtriangular, occipital, deep brown patch. A post-ocular vitta of the same color. Hind legs barred with reddish brown. Beneath unicolor, whitish anteriorly, reddish posteriorly. Vomerine teeth in two elongated groups, obliquely situated between the inner nostrils; latter proportionally large. Tympanum not visible exteriorly. Eustachian tubes very minute. No lumbar glands. Fingers and toes depressed, latter margined with a membranous fold, otherwise smooth. Two metatarsal tubercles. Tarsus with a ridge along its inner margin. Skin minutely granular.

Locality.—Valparaíso, Chili.

5. *CRINIA (RANIDELLA) SIGNIFERA*, G.—Skin above subtuberculous, beneath glandulous. A spear-shaped blotch on the head. A broad dorsal, deep brown band, forked anteriorly to receive the point of the cephalic spear-shaped blotch. On each side of the latter a greyish or yellowish grey narrow band, beneath which is another, still narrower, blackish brown band. Sides of abdomen and belly marmorated.

Locality.—New Holland.

HYLÆ.

RANOIDEA, Tsch.—Vomerine teeth disposed in two groups situated between the inner nostrils. Tongue large, subcircular or elliptical, slightly notched posteriorly, and free for about one-third or less of its length. Tympanum distinct. Eustachian tubes of considerable development. Fingers and toes depressed, terminated by subelliptical disks, comparatively small. Fingers perfectly free; toes webbed to a considerable degree. A vocal subgular bladder in the male.

Obs.—The characters of this genus when compared to those of *Hyla*, may appear negative. The general physiognomy, which is more ranoid than hyloid, and the smallness of the subdigital disks, are the two most prominent features of this group. The addition of two species partaking of the characters of the one, unique when the genus was made, will add to the importance of retaining it in the herpetological system. If habits go for any thing in the distinction of genera, the fact that *Ranoidea* are more frequently seen about the waters than on the trees, would certainly have a weight upon the question.

6. *RANOIDEA RESPLENDENS*, G.—Deep green above, maculated and streaked with gold. Head depressed, elongated. Tongue of medium size, notched and free posteriorly. Vomerine teeth in two transversely elongated groups, situated between the inner nostrils; latter semicircular, large. Openings of the Eustachian tubes as large as the inner nostrils. Tympanum very distinct, large, elliptical. Fingers free. Toes webbed up to the digital disks; membrane emarginate.

Locality.—Wollongong Illawara, near the coast.

7. *RANOIDEA FLAVOVIDRIS*, G.—Above green, with a black line along the can-

thus rostralis, and a black band behind the eye. Posterior parts of thighs purplish, with white dots. Head flat, discoid. Tongue large, elliptical, slightly notched and free posteriorly. Vomerine teeth in two oblong groups between the inner nostrils, the latter being very large. Tympanum of medium size, circular. Fingers free. Toes webbed to the middle of the last phalanx; membrane slightly emarginated.

Locality.—Wollongong Illawara; about fresh water streams.

HYLARANA, Tsch.—Tongue elongated, narrower in front, broad and forked posteriorly. Two groups of vomerine teeth, between and sometimes a little behind the inner nostrils. Tympanum very distinct. Eustachian tubes of medium size. Four fingers entirely free; toes united by a membrane to almost their whole length; subdigital disks of medium size.

Obs.—*Hylarana* has the priority over *Lymnodytes*, therefore it is here adopted.

HYLARANA ERYTHRÆA (*Hyla erythræa*, Schleg.); H. CHALCONOTA (*Hyla chalconota*, Schleg.), and H. WAIGIENSIS (*Lymnodytes waigiensis*, Dum. and B.)

8. HYLARANA MINDANENSIS, G.—Uniform greenish brown, lighter beneath; upper jaw provided with several darker spots. Vomerine teeth disposed in two elongated groups or series, situated between and behind the inner nostrils. Skin provided with small pustules, but showing no traces of a lateral glandulous chain.

Locality.—Caldera, on Mindanoo.

HALOPHILA, Girard.—Vomerine teeth forming two oblong groups, situated between and somewhat behind the inner nostrils. Tongue elongated, lanceolated, narrow anteriorly, forked posteriorly, and free for about half its length. Tympanum very distinct. Eustachian tubes of medium size. Four fingers entirely destitute of membrane. Toes united at their base only by a rudimentary membrane. Subdigital and terminal disks either but little or much developed.

9. HALOPHILA HEROS, G.—Greenish brown, with a dorsal light and narrow line. Sides of abdomen and legs with blackish spots; beneath dull brown. Rudimentary membrane of the base of the toes almost obliterated. Subdigital disks small in both pairs of limbs.

Locality.—Sebukea, Fiji Islands.

10. HALOPHILA VITIENSIS, G.—Uniform yellowish orange when adult; the young yellowish purple, with golden reflections on the head and back, a whitish line on the middle of the back, flanked with black maculæ; legs transversely barred with black. Rudimentary membrane of the base of the toes very distinct. Subdigital disks large in both pairs of limbs.

Locality.—Sebuka, Fiji Islands.

11. HYLØDES PARVUS, G.—Uniform blackish brown. Vomerine teeth disposed upon two elongated groups obliquely situated behind the inner nostrils. Tongue cordiform, posteriorly entire. Fingers and toes subcylindrical and slender. Digital disk small.

Locality.—Rio de Janeiro, Brazil.

12. ELOSIA BUFONIUM, G.—Vomerine teeth in two small oblong groups, situated obliquely between the inner nostrils, in advance of the posterior margin of these openings. Tongue discoid, large. Tympanum of medium size. Eyes large and prominent. Legs comparatively small. Two very small metatarsal tubercles, and a membranous ridge along the inside of the tarsus. Skin quite smooth, without any pustules at all.

Locality.—Rio de Janeiro, Brazil.

13. ELOSIA VOMERINA, G.—Head and back dusky brown; posterior part of back and legs maculated. A deep brown band extending from the side of the head over the eye to the side of the back. Beneath unicolor. Vomerine teeth disposed on a transverse line, interrupted in its middle, and placed on a level with the anterior margin of the inner nostrils. Tongue subcircular, discoid. Tympanum of medium size. Eyes well developed. Legs long and slender. Two

metatarsal tubercles, and a cutaneous fold on the inside of the tarsus. Skin smooth.

Locality.—Rio de Janeiro, Brazil.

BUFONIDÆ.

14. *RHINODERMA SIGNIFERA*, G.—Head and body above reddish, dotted with white. A few transverse, narrow black bars on the hind legs; an elongated whitish spot behind the occiput; an elliptical, greyish, lumbar ocellus, black-spotted posteriorly. Abdomen maculated with white and black. Toes elongated, webbed at their base only. Tubercles under the articulations of the fingers and the toes.

Locality.—Rio de Janeiro, Brazil.

15. *BUFO LUGUBROSUS*, G.—Head and dorsal region blueish black; sides reddish grey with black patches. Tympanum black; limbs black spotted. Beneath dull yellowish white. First finger longer than the second, and almost as long as the third. Upper surface of head grooved from occiput to the snout. Eyes protected anteriorly and posteriorly by an elevated ridge. Tympanum quite small. Parotids of medium size, not very conspicuous. Toes webbed at their base only. Two metatarsal tubercles, and another at the base of the inner toe. A membranous ridge along the inner side of the tarsus. Skin glandulous and granulated.

Locality.—Valparaiso, Chili.

16. *BUFO GRACILIS*, G.—Upper parts yellowish brown: a yellow dorsal vitta, on each side of which are black angular and irregular spots. Limbs marked with blackish blotches. Sides light yellow. Beneath dull yellow. First finger longer than the second, and almost as long as the third. Upper surface of head, between and behind the eyes, concave. Snout even above, and obliquely truncated inwardly. Tympanum comparatively large. Parotids very small and exiguous; a lateral glandulous fold of the skin from the parotids to the groins. Toes webbed only at their base. Metatarsal tubercles inconspicuous. A membranous fold along the inner side of the tarsus. Skin granular.

Locality.—Rio de Janeiro, Brazil.

BUFONELLA, Girard.—Tongue elongated, broadest posteriorly and free to a certain extent, slightly emarginated behind. No teeth on the palate. Tympanum distinct. No parotid glands. Four fingers, free and subcylindrical. Five toes, of the same form as the fingers, neither webbed nor provided with any rudimentary membrane.

Obs.—Allied to *Bufo*, *Engystoma* and *Breviceps*.

17. *BUFONELLA CRUCIFERA*, G.—Deep brown above; back dotted with yellow; a yellow spot at the origin of the arms; a yellow band across the head, over the eyelid, sending off a medial branch to the snout; a yellow dorsal vitta on the posterior half of the body. Beneath blackish brown, with large yellowish maculæ under the head, belly and legs. Tip of fingers and toes yellow. Head and body elongated; former depressed; latter subcylindrical. First finger shorter than the second. Toes free. Metatarsal tubercles indistinct.

Locality.—New Holland.

METAEUS, Girard.—Tongue subelliptical, entire, free posteriorly for about half of its length. Palate without teeth. Tympanum hidden under the skin. No parotid glands. Four fingers and five toes completely free. Two metatarsal tubercles.

Obs.—Related to *Engystoma*.

18. *METAEUS TIMIDUS*, G.—Greenish brown above, maculated with brownish black. A vitta extends from the snout, across the eye, to the shoulder. Head large, rounded on the snout. Fingers and toes subcylindrical. Skin provided with small pustules.

Locality.—Valparaiso, Chili.

The Committee on Dr. Hoy's continuation of his "Notes on the Ornithology of Wisconsin," reported in favor of publication.

Notes on the Ornithology of Wisconsin.—Water Birds.

[Concluded.]

RALLIDÆ, (6 species.)

*GALLINULA GALEATA, *Lich.*

Abundant as far north as Lake Winnebago, latitude 44°.

*FULICA AMERICANA, *Gmel.*

Common in all large marshes.

*RALLUS ELEGANS, *Aud.*

Abundant, nest in the prairie slews.

*RALLUS VIRGINIANUS, *Linn.*

Common.

*ORTYGOMETRA CAROLINA, *Linn.*

Greatly abundant spring and fall, a few remain during summer to nest.

*ORTYGOMETRA NOVEBORACENSIS, *Lath.*

By no means uncommon. The young of this and the preceding three species of Rail are fully fledged by the 15th of August.

GRUIDÆ, (10 species.)

GRUS AMERICANA, *Forster.*

A few white sandhill cranes are occasionally seen in the western part of the State, near the Mississippi, but never approach the Lake shores, where the following species is common. It would appear that the white is a more southern species than the brown.

*GRUS CANADENSIS, *Temm.*

Found on all our large prairies. Although we have seen large flights of these birds, we never saw, or heard of, a white individual within one hundred miles of Lake Michigan. A pair has nested regularly for fifteen years in a swamp nine miles from Racine, (we have noticed them ourselves regularly for the last seven years,) and they still continue in color unchanged. The locality of this nest is in a few tussocks of grass, in the midst of an almost impenetrable swamp, the nest is composed of coarse grass, built up in a conical form eighteen inches or two feet high, so situated that when the parent bird sits upon, or rather astride of this pyramidal nest, her feet hang down on either side into the water. The old nest is regularly repaired every spring.

TANTALUS LOCULATOR, *Linn.*

There is a fine specimen of this southern bird in the museum of the Wisconsin State Historical Society, at Madison, which was shot near Milwaukee, September, 1852.

*ARDEA HERODIAS, *Linn.*

A common species.

*ARDEA VIRESCENS, *Linn.*

Not uncommon in the wooded swamps of the timbered districts, never met with in the prairie marshes.

*BOTAURUS LENTIGINOSUS, *Swains.*

Abundant in the marshes and slews of the prairies. The young are fully fledged by the 20th of July. We have witnessed the bittern emit his peculiar call—"pump-ā-gāh;" the head is drawn up to the breast, the neck being much dilated, when the first syllable *pump* is uttered in a heavy low tone, the second syllable *āu* is emitted with a partial extension of the neck, and the final *gāh* is accompanied with a violent darting forward of the head to the full extent of his

long neck. This ludicrous performance is repeated three or four times in succession.

**ARDEOLA EXILIS*, *Bonap.*

Abundant on the reedy marshes, never found in the dark, shaded, woody swamps.

EGRETTA LEUCE, *Jardine.*

A single individual shot near Racine, June, 1851.

**EGRETTA CANDIDISSIMA*, *Gmel.*

Not an uncommon species along the borders of small lakes. Nest in communities, on trees in Tamarack swamps.

EGRETTA CAERULEA, *Jard.*

Shot one August 28th, 1848, on Root river.

CHARADRIADÆ, (6 species.)

CHARADRIUS MARMORATUS, *Wagler.*

Visit us in great numbers spring and fall.

CHARADRIUS MELODIUS, *Ord.*

Occasionally met with in the fall, not numerous.

**CHARADRIUS VOCIFERUS*, *Linn.*

Common, arrive from 18th to 25th of March.

CHARADRIUS SEMIPALMATUS, *Bonap.*

A few only met in May and October. Rare.

CHARADRIUS HELVETICUS, *Linn.*

Not abundant, April and October.

STREPSILAS INTERPRES, *Linn.*

Common, spring and autumn.

SCOLOPACIDÆ, (27 species.)

TRINGA ALPINUS, *Linn.*

Only met with sparingly, April and October.

TRINGA SHINZII, *Brehm.*

A rare species with us. Spring and fall.

TRINGA PECTORALIS, *Bonap.*

We have only noticed this species in autumn.

TRINGA RUFESCENS, *Vieill.*

Quite common from September 15th to October 10th. Never met in the spring.

TRINGA MARITIMA, *Brunnich.*

Greatly abundant from 15th of April to 20th of May.

TRINGA MINUTA(?), *Leister.*

Not common. A few found on the borders of small lakes.

**TRINGA PUSILLA*, *Wils.*

Common. Nest in the reedy marshes.

TRINGA CINEREA, *Wils.*

We have only met this bird in October. Rare.

TRINGA SEMIPALMATA, *Wils.*

Shot several October 1st, 1850. Rare.

TRINGA DOUGLASSII, *Swains.*

Shot two April 10th, 1848. Rare.

CALIDRIS ARENARIA, *Illiger.*

Common on the lake shore spring and fall.

TOTANUS SEMIPALMATUS, Lath.

We have met this species as late as the 10th of June. Not numerous.

**TOTANUS VOCIFERUS, Wils.*

Abundant. Nest in all large marshes.

**TOTANUS FLAVIPES, Lath.*

Common.

**TOTANUS SOLITARIUS, Wilson.*

Not uncommon.

**TOTANUS MACULARIUS, Wilson.*

Common.

**TOTANUS BARTRAMIUS, Wilson.*

Abundant. Nest on the high rolling prairies.

LIMOSA FEDOA, Linn.

Not an uncommon bird. We saw a pair on a marshy slew near Wisconsin river, June 15th, 1848, where they were probably nesting.

LIMOSA HUDSONICA, Lath.

We shot a single bird of this well marked species November 1st, 1850.

MACRORHAMPUS GRISEUS, Leach.

Found sparingly spring and fall.

**SCOLOPAX WILSONII, Temm.*

Common. Nest abundantly with us.

**RUSTICOLA MINOR, Vieill.*

The first woodcock noticed in this section was in 1847, since which time they have been rapidly on the increase.

RECURVIROSTRA AMERICANA, Linn.

We saw a pair on a marsh near Fox river, July 26th, 1846, where they had probably nested; we also met with a small party on the Des Plaine, May, 1847.

HIMANTOPUS NIGRICOLLIS, Vieill.

Met a small flock of these singular birds near Racine, April, 1847.

**NUMENIUS LONGIROSTRIS, Wilson.*

Common on the large thinly settled prairies. We found them nesting in abundance on Sun Prairie, Columbia county; also within six miles of Ceresco.

**NUMENIUS HUDSONICUS, Lath.*

Common spring and fall. We found a few nesting near Fox Lake, June 15th, 1848.

NUMENIUS BOREALIS, Lath.

Met with in company with the preceding in early spring and fall. Rare.

PINNATIPEDES, (2 species.)

PHALAROPUS FULICARIUS, Bonap.

Met with a small flock first of November, 1847. Rare.

**LOBIPES WILSONII, Jardine.*

Not an abundant species. Prof. S. F. Baird shot one near Racine July 15th, 1853. Nests sparingly in marshes.

ANATIDAE, (29 species.)

**ANSER CANADENSIS, Linn.*

Greatly abundant spring and fall, and not a few remain during the summer to nest.

ANSER HYPERBOREUS, Gmel.

This species is seen late in the fall in large flocks, numbering sometimes not less than two hundred.

ANSER ALBIFRONS, Bechst.

Met in large numbers spring and fall.

ANSER LEUCOPSIS, Bechst.

In December, 1850, there was a single barnacle-goose kept about the harbor for two weeks.

ANSER BERNICLA, Linn.

Occasionally met on the lake shore. Rare.

ANSER HUTCHINSII, Rich.

Large flocks of this species occasionally visit us in the fall, rarely seen in the spring.

CYGNUS AMERICANUS, Sharpless.

Visit us regularly spring and fall.

CYGNUS BUCCINATOR, Rich.

This larger swan is frequently seen, and occasionally shot in our vicinity.

**ANAS CLYPEATA, Linn.*

Not uncommon. A few nest in the prairie slews.

**ANAS BOSCHAS, Linn.*

Common.

**ANAS OBSCURUS, Gmel.*

Numerous in the interior—seldom visit the lake.

ANAS STREPERA, Linn.

Shot 2d March, 1848, the only specimens we ever met with.

DAFILA ACUTA, Linn.

Common only early in spring and late in the fall.

MARECA AMERICANA, Gmel.

Abundant.

**QUERQUEDULA DISCORS, Linn.*

Very abundant. Nest in all the large slews.

**QUERQUEDULA CAROLIENSIS, Steph.*

Common.

**DENDRONESSA SPONSA, Linn.*

Common.

FULIGULA RUBIDA, Wilson.

Met occasionally fall and spring. Not abundant.

FULIGULA VALISNERIA, Wilson.

Rarely met. March and October.

FULIGULA FERINA, Linn.

Not uncommon.

**FULIGULA MARILA, Linn.*

Common.

**FULIGULA RUFITORQUES, Bonap.*

Common. Nests on the borders of grassy lakes.

CLANGULA VULGARIS, Fleming.

Common on the lake in winter and early spring.

CLANGULA ALBEOLA, Linn.

Common.

CLANGULA HISTRIONICA, Linn.

One shot in Racine harbor December 15th, 1851. Rare.

HARELDA GLACIALIS, Linn.

Common on the lake during winter and early spring.

MERGUS-MERGANSER, Linn.

Common. Remain during winter.

**MERGUS SERRATOR, Linn.*

Common. A few nest with us.

**MERGUS CUCCULATUS, Linn.*

Abundant. Nest on the reedy flats.

PELACANIDÆ, (2 species.)

PHALACROCORAX DILOPHUS, Swain.

Occasionally visit our rivers and small lakes. Rare.

PELECANUS ONOCROTALUS, Linn.

About the 10th of March the pelicans arrive, and after spending a few days in the small lakes, go further north.

LARIDÆ, (9 species.)

STERNA CAYANA, Lath.

Rarely visit us.

**STERNA NIGRA, Linn.*

Abundant about lakelets and marshes. Never found on Lake Michigan.

STERNA ANGLICA, Montague.

We have but seldom met the marsh Tern in this vicinity.

**STERNA HIRUNDO, Linn.*

Abundant. Nest on a small rocky island in the northern part of Lake Michigan.

LARUS FRANKLINII, Rich.

Visit us only in severe winters. Rare.

LARUS BONAPARTII, Rich.

Associate with the common Tern fall and spring in great numbers.

LARUS GLAUCUS, Brunnich.

Another rare winter visiter.

**LARUS ARGENTATUS, Brunnich.*

The common gull of the lakes. Nest on a rocky island in company with the common Tern.

LARUS ZONORHYNCHUS, Rich.

A rare species with us. Mr. Samuel Circum has a specimen shot at Milwaukie.

COLYMBIDÆ, (5 species.)

**COLYMBUS GLACIALIS, Linn.*

Common.

COLYMBUS SEPTENTRIONALIS, Linn.

Not uncommon during winter.

PODICEPS RUBRICOLLIS, Lath.

Only found in winter. Rare.

PODICEPS CORNUTUS, Linn.

Common spring and fall.

**PODICEPS CAROLIENSIS.*

Common. Nest in marsh.

On leave granted, Dr. Le Conte presented for publication a paper by Profs. W. H. Harvey and J. W. Bailey, on new species of Diatomaceæ, collected by the U. S. Exploring Expedition; which was referred to Drs. Leidy, Le Conte, and Zantzinger.

The Committee stated that the paper had already been examined and was approved by them, and they accordingly reported in favor of its publication in the Proceedings.

New species of Diatomaceæ, collected by the United States Exploring Expedition, under the command of Capt. Wilkes, U. S. N.

By PROFESSOR W. H. HARVEY and PROFESSOR J. W. BAILEY.

The species of Diatomaceæ here described as new, together with the other species included in the list on page 431, were detected either as parasites upon Algæ, or entangled in mud adhering to shells, algæ, &c., brought home by the Exploring Expedition under the command of Capt. Wilkes.

1. *AMPHITETRAS FAVOSA*, Harvey et Bailey. Loricis tabularibus; lateribus vix concavis, primario; secundario quadrangulo, angulis fere rectis vix productis, superficie cellulis magnis hexagonis tessellata. *Hab.* Mindanao.

2. *AMPHITETRAS WILKESII*, H. et B.; loricis prismatico-tabularibus, lateribus concavis, primario longitudinaliter striato-punctato medio transversim zonato; secundario quadrangulo, angulis productis rotundatis, superficie cellulis minutis in lineas simplices furcatasque dispositis notata, prominentiis jugalibus punctulatis. *Hab.* Puget's Sound.

3. *AULACODISCUS OREGANUS*, H. et B.; loricâ prominentiis tredecim intramarginalibus instructa, a quibus tot radii fere ad umbonem procurrent; superficie præter umbonem glaberrimum, minute punctata iridescente. *Hab.* Puget's Sound.

4. *CAMPYLODISCUS KUTZINGII*, H. et B.; sellæformis late marginata sulcis subquinginta transversis continuis curvatis impressa. *Hab.* Mindanao.

5. *COCCONEIS PARMULA*, H. et B.; late elliptica, linea media longitudinali notata, utroque latere costis (vel sulcis) transversis magnis 10-12 irregularibus impressa; superficie transversim striato-granulata. *Hab.* Tahiti.

6. *COCCONEIS RHOMBIFERA*, H. et B.; late elliptica vel suborbicularis linea media oblique-longitudinali sigmoidea areolam glabratam percurrente quæ apice et basi attenuata est, et versus umbonem in rhombi formam ampliata; superficie decussatim et transversim punctata. *Hab.* Puget's Sound.

7. *COCCONEIS SULCATA*, H. et B.; late elliptica vel suborbicularis transversim sulcata, subcis 30-40 arcuatis. *Hab.* Puget's Sound.

8. *HYALOSIRA PUNCTATA*, H. et B.; loricis magnis in catenas longas co-ordinatis rectangulis subquadratis transversim interrupte vittatis; vittis medio loricæ alternantibus granulatis, alternis serie punctarum insignium ornatis. *Hab.* Tahiti.

9. *ISTHIA MINIMA*, H. et B.; zona transversali subtilissime decussatim punctata, lateribus (secundariis) cellulis magnis granulata. *Hab.* Rio Janeiro and Sooloo Sea.

10. *TRICERATIUM CONCAVUM*, H. et B.; loricâ lateribus valde concavis angulis rotundatis, superficie triquetra cellulis minutis in lineas radiantibus simplices furcatas co-ordinatis notata; prominentiis jugalibus punctulatis. *Hab.* Tahiti.

11. *TRICERATIUM GIBBOSUM*, H. et B.; parvum, fere inflato-globosum, lateribus valde convexis, angulis prominentibus, superficie ut in *T. concavum* notata. *Hab.* Tahiti.

12. *TRICERATIUM ORIENTALE*, H. et B.; magnum; lateribus convexis angulis

productis obtusis, superficie triquetra cellulis magnis hexagonis favosa. *Hab.* Mindanao.

13. *TRICERATIUM WILKESII*, H. et B.; loricâ lateribus convexiusculis angulis rotundatis, superficie ut in *T. concavum* notata. *Hab.* Puget's Sound.

Appendix.

14. *LAGENA WILLIAMSONI*, H. et B.; testa bicellulosa, cellulis diversis, inferiore ellipsoidea longitudinaliter costata in isthmum infundibuliformem attenuata, et ad cellulam superiorem glabram semi-lagenæformem (vel inverse infundibuliformem) ferruminata; collo breviusculo recto, ore subampliato. *Hab.* Mindanao.

List of Diatomaceæ, collected by the United States Exploring Expedition under Capt. Wilkes, U. S. N.

By PROF. J. W. BAILEY.

Although no collection of the Diatomaceæ was purposely made by the Exploring Expedition, a careful examination of various specimens of marine mud, &c. adhering to the algæ, shells, &c., which were brought home by Capt. Wilkes, was rewarded by the discovery of many interesting forms, a list of which is here given in the order of their geographical distribution.

Puget's Sound, Oregon.

DIATOMACEÆ.

<i>Actinoptychus senarius</i> , Ehr.	<i>Grammatophora undulosa</i> , Ehr.
* <i>Aulacodiscus Oreganus</i> , H. et B.	<i>Isthmia obliquata</i>
* <i>Amphitetras Wilkesii</i> , H. et B.	<i>Rhabdonema arcuatum</i> , Kütz.
<i>Arachnoidiscus Ehrenbergii</i> , Bailey.	<i>Surirella fastuosa</i> , Ehr.
* <i>Cocconeis rhombifera</i> , H. et B.	* <i>Triceratium Wilkesii</i> , H. et B.
* " <i>sulcata</i> , H. et B.	<i>Spongiolites</i> , &c.
<i>Coccinodiscus oculus-iridis</i> , Ehr.	<i>Spongiolites Agaricus</i> , Ehr.
" <i>radiatus</i> "	<i>Dictyocha splendens</i> , Ehr. This is now
" <i>excentricus</i> "	known to be a calcareous plate from a
<i>Epithemia gibberula</i> , Kütz.	species of <i>Synapta</i> . It dissolves in
<i>Grammatophora angulosa</i> , Ehr.	acids, and polarizes light.
" <i>stricta</i> , "	

San Francisco, California.

Arachnoidiscus Ehrenbergii, Bail.
Cocconeis scutellum, Ehr.
Gomphonema minutissima, Ehr.

Terra del Fuego.

Entopyla australis, Ehr.
Grammatophora serpentina, Ehr.
 " *stricta* "

Rio Janeiro.

Climacosphænia australis, Kütz. *Dictyocha splendens*, Ehr.
Grammatophora oceanica, Ehr. *Spongiolites anchora*, "
**Isthmia minima*, H. et B. Both of these come from the calcareous
particles of an Echinoderm (*Synapta*).

Valparaiso.

Stauroptera aspera, Ehr. *Gallionella sulcata*, Ehr.
Cocconeis scutellum, " *Grammatophora hamata*, Ehr.
Actinoptychus senarius, Ehr. *Dictyocha speculum*, "

Phillipine Islands.

*Amphitetras favosa, H. et B.	Navicula elongata, Ehr.
Amphora libyca, Ehr.	“ Lyra, “
*Campylodiscus Kützingii, H. et B.	Pinnularia didyma, “
Coscinodiscus linearis, Ehr.	Surirella fastuosa “
Denticella Biddulphia, “	Tetragramma asiatica, Ehr.
Gallionella sulcata, “	*Triceratium orientale, H. et B.
Grammatophora oceanica, Ehr.	Dictyocha splendens.
	Spongiolites Agaricus.

Sooloo Sea.

Coscinodiscus excentricus, Ehr.	Surirella fastuosa, Ehr.
“ marginatus “	Triceratium Favus, <i>β. acuminatus</i> , Bail.
Gallionella sulcata, “	Spongiolites Agaricus, Ehr. In situ,
Grammatophora oceanica, “	forming bunches in the tissue of a
*Isthmia minima, H. et B.	sponge.

Wilson's Island.

POUMOUTA GROUP.

Climacosphænia australis, Kütz.	Stauroptera aspera, Ehr.
Podocystis adriatica, Kütz.	Pinnularia didyma, “

Tahiti.

Climacosphænia australis, Kütz.	Navicula Sigma, Ehr.
*Cocconeis Parmula, H. et B.	Podocystis adriatica, Kütz.
Denticella Biddulphia ? Ehr.	Stauroptera aspera, Ehr.
Grammatophora oceanica, Ehr.	Triceratium concavum, H. et B.
Gallionella sulcata, “	Epithemia musculus, Kütz.
*Hyalosira punctata, H. et B.	

Tongataboo.

Denticella Biddulphia ? Ehr.	Grammatophora oceanica, Ehr.
Epithemia musculus, Kütz.	Synedra superba, Kütz.

New Zealand.

A large collection of marine Algæ from New Zealand was examined, but no Diatomaceæ could be detected adhering to them.

Those marked thus () are believed to be new, and are described on page 430.